

Trend Study 21A-23-03

Study site name: Baker Canyon.

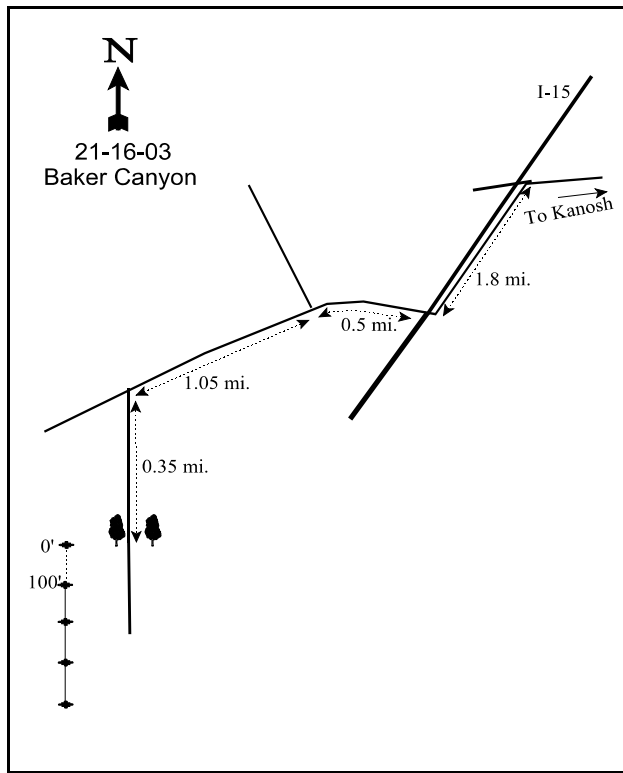
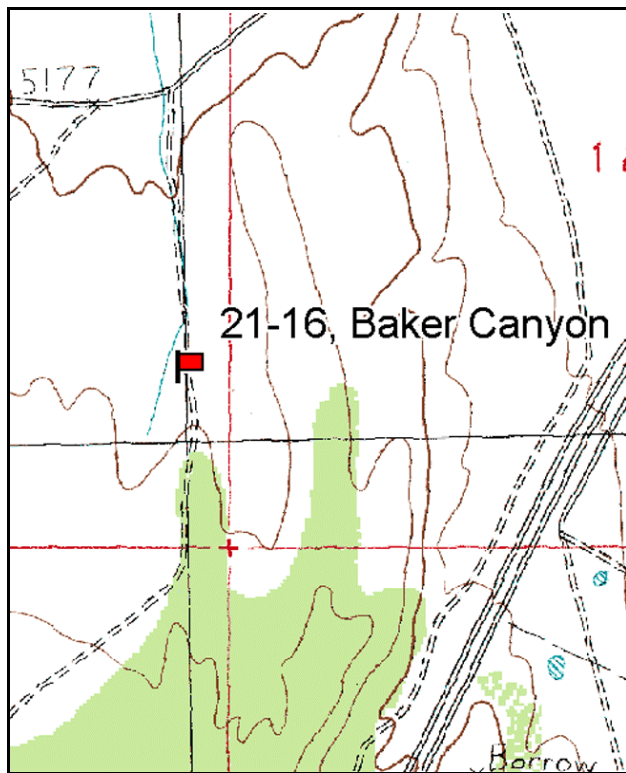
Vegetation type: Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Proceed south from Kanosh on the main road. Turn left just before the I-15 interchange. Travel on the frontage road for 1.8 miles (paralleling the freeway on the east side) to an overpass. Go over the interstate and continue 0.5 miles west to a fork. Take the left fork and go about 1.05 miles. Just beyond the point of a small hill turn left on a 2-tire track road. Go 0.35 miles to the first point where the road squeezes between two junipers. From the south side of the large juniper to the right, go 100 feet due west to the start of the frequency baseline. The 0-foot baseline stake is a rebar, tagged #7071.



Map Name: Cove Fort

Diagrammatic Sketch

Township 24S, Range 7W, Section 11

GPS: NAD 27, UTM 12S 4288116 N, 360986 E

DISCUSSION

Baker Canyon - Trend Study No. 21-16

The Baker Canyon trend study samples deer winter range west of Interstate 15 and the White Sage Flat area. It is an arid, nearly level site with a slight west, northwest aspect at an elevation of 5,300 feet. The range type is Wyoming big sagebrush-grass with scattered junipers. Some of the surrounding area was plowed and drilled with Russian wildrye in 1967, but the study site itself was not treated. The BLM did a control burn of the area prior to the 1991 survey to reduce Wyoming big sagebrush. The original frequency baseline remained unburned but the density plots were burned. The baseline was extended in 1998 which included the original frequency baseline and the burned density plots. This area has been used for spring grazing on a three pasture rest-rotation system. Traditionally, deer concentrate in the White Sage Flat area in the winter and spring, but past use was reported as being light. Sheep appeared to have used the area in the past putting heavy pressure on the sagebrush. Pellet group data from 1998 estimated 19 deer and 7 cow use days/acre (47 ddu/ha and 17 cdu/ha). Only 1 deer pellet group was sampled in the pellet group transect in 2003, while cattle use was estimated at 12 days use/acre (30 cdu/ha). The minimal amount of deer use on this site is concentrated in the fingers of unburned sagebrush. Use is also light due to the deer proof fence, built along I-15, which essentially eliminates historical winter deer migrations to the area. The heaviest use on this site appears to come from rabbits.

The soil is a moderately shallow, sandy clay loam of the Pharo Series which is very cobbly on the surface and throughout the soil profile. Parent material is limestone. Effective rooting depth was estimated at just over 11 inches. Soils on the site have undergone moderate erosion in the past as evidenced by pedestalling around bunchgrass and sagebrush stems, as well as the concentration of pavement and rock on the surface. Cover of rock and pavement has ranged from 25% to 37%. There is a buildup of litter and soil around the plants, but generally litter cover is low and bare soil abundant. Soil movement is not a serious problem because of the levelness of the terrain. An erosion condition class rated soils as stable in 2003. Average soil temperature at 12 inches in depth was high at nearly 70°F in 2003 indicating a dry soil profile.

Wyoming big sagebrush is the key browse although its density was greatly reduced following the controlled burn. Nearly all of the sagebrush on the site occurs within the unburned section while burned areas are dominated by herbaceous vegetation. Sagebrush density was estimated at 4,000 plants/acre in 1985, but only 780 and 560 plants/acre in 1998 and 2003 respectively. In the past, the rather short sagebrush plants had a "clubbed" appearance, which may be the result of past heavy hedging and poor annual growth. Utilization of the sagebrush was rated as moderate in all surveys with the exception of 2003 when use was light. Percent decadence and plants displaying poor vigor both increased in 2003 and no young plants were sampled. Annual sagebrush leaders averaged 1.3 inches of growth in June 2003.

Nevada ephedra provides additional palatable forage. Density was estimated at 100 plants/acre in 1998 increasing to 320 plants/acre in 2003. Rabbits have utilized some of the lower growing ephedra plants, but overall use is light to moderate. Sixty-nine percent of the ephedra sampled in 2003 were young plants indicating a possible population increase in the future. Some juniper trees were killed by the burn, but many remain scattered throughout the area.

Herbaceous vegetation makes up a significant component of this site especially on the burned portions. The most common perennial grasses are bluebunch wheatgrass, Sandberg bluegrass, and bottlebrush squirreltail. Although not abundant on the transect, Russian wildrye was drill seeded as part of the original plowing treatment. It is quite abundant in the surrounding areas. The perennial grasses were large and robust in 2003 and had not been utilized. Cheatgrass is present but not dominant. Cheatgrass significantly decreased in nested frequency between 1998 and 2003 and average cover declined by nearly 80%. Perennial forbs are moderately abundant for this arid, low elevation site. Scarlet globemallow, Hood's phlox, and two *Astragalus*

species are the primary perennial forbs on the site. Annual forbs, primarily pale alyssum and bur buttercup, were very abundant in 1998 with the wet spring of that year. In 2003, drier conditions resulted in a dramatic decline in forbs.

1985 APPARENT TREND ASSESSMENT

Soil trend appears stable, mainly due to the levelness of the site. Vegetative trend also appears stable, except junipers appear to be slowly encroaching onto the sagebrush flat. The sagebrush appears to have been very heavily used but the age class composition indicates a self-sustaining population. This is an area where deer look for an early green-up feed source each spring. Any management to increase the herbaceous component without eliminating the sagebrush would be beneficial to both deer and livestock.

1991 TREND ASSESSMENT

The soil trend is stable with a slight increase in vegetative basal cover and small decrease in percent bare ground. The most significant change is the burn treatment that took place since 1985. It effected the density plots, but not the frequency baseline. The burn effectively left a mosaic pattern of shrub and grass openings. The key browse species, Wyoming big sagebrush, decreased by 95% while all of the juniper around the density plots were killed by the fire. For key browse, the overall trend is down. The herbaceous understory has shown significant improvement for the grasses, but much of the increased sum of nested frequency for forbs is for increasers like Russian thistle. Bluebunch wheatgrass, Indian ricegrass, Sandberg bluegrass, and bottlebrush squirreltail have all demonstrated substantial increases in their frequencies. The change is more significant than the data shows due to the fact that nearly all of the frequency data comes from the unburned part of the frequency baseline. Overall trend for herbaceous understory is up.

TREND ASSESSMENT

soil - stable (3)

browse - down (1)

herbaceous understory - up (5)

1998 TREND ASSESSMENT

Trend for soil appears down due to an increase in percent bare ground from 24% to 41% and a decline in litter cover (43% to 29%). Some of the differences are due to the much larger sample used in 1998 which sampled more of the burned areas. Previous frequency and cover data came almost entirely from an unburned finger of Wyoming big sagebrush which actually has higher vegetation and litter cover. The burned areas contain mostly bunchgrasses with bare ground in between. Photo point comparisons do not show any significant changes in ground cover characteristics. With this in mind, trend for soil is considered stable. No erosion is noticeable due in part to the level terrain. Trend for browse appears stable. Again, the last reading sampled sagebrush only in burned areas while the new, much larger sample includes part of the original frequency baseline which was left mostly unburned. Most of the mature and decadent shrubs sampled occurred within this unburned section. Utilization of the sagebrush is similar to 1991 levels, vigor is normal on all plants and percent decadence is low at 15%. However, recruitment is poor with no seedlings and few young being sampled. Trend for the herbaceous understory is stable for grasses but down for forbs. Nested frequency of the dominant grass, bluebunch wheatgrass, has increased significantly since 1991. This was in part due to the fact that more of the burned areas were sampled in 1998 where bluebunch wheatgrass is more abundant. All other perennial grasses encountered in 1991 declined significantly in nested frequency. Sum of nested frequency for perennial forbs has declined since 1991, but much of the difference is due to a lower frequency of Russian thistle. Trend is considered stable for the herbaceous understory.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

2003 TREND ASSESSMENT

Trend for soil is stable. Bare soil decreased by over 50% in 2003, but vegetation and litter cover also slightly declined. Rock and pavement increased, and erosion is not excessive. Trend for browse is slightly down. The key browse, Wyoming big sagebrush, declined in density, has no recruitment, and 21% of the population was classified in poor vigor. Percent decadence also increased from 15% to 29%. The most positive change in the browse component is due to the increase in Nevada ephedra. Young plants make up 69% of the population indicating a possible increase in the future. The herbaceous understory is stable overall although perennial grasses and forbs show opposite trends. Perennial grasses increased in sum of nested frequency while perennial forbs decreased. Bluebunch wheatgrass and bottlebrush squirreltail are stable while Sandberg bluegrass is increasing. Cheatgrass is much less abundant in 2003 compared to 1998.

TREND ASSESSMENT

soil - stable (3)

browse - slightly down (2)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --

Management unit 21 , Study no: 16

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron spicatum	_a 77	_a 69	_b 132	_b 134	7.48	9.98
G	Bromus tectorum (a)	-	-	_b 238	_a 100	6.51	1.39
G	Elymus junceus	-	-	1	-	.00	-
G	Oryzopsis hymenoides	_a 4	_b 23	_a 8	_{ab} 14	.39	.38
G	Poa fendleriana	8	-	1	-	.15	-
G	Poa secunda	_a 53	_{ab} 96	_a 62	_b 110	1.73	2.16
G	Sitanion hystrix	_a 28	_b 68	_a 24	_a 22	.52	.68
Total for Annual Grasses		0	0	238	100	6.51	1.39
Total for Perennial Grasses		170	256	228	280	10.27	13.23
Total for Grasses		170	256	466	380	16.79	14.62
F	Alyssum alyssoides (a)	-	-	_b 304	_a 19	3.30	.05
F	Antennaria rosea	-	3	-	-	-	-
F	Astragalus calycosus	_a -	_c 48	_c 62	_b 12	.93	.08
F	Astragalus marianus	_b 17	_b 26	_{ab} 3	_a -	.04	-
F	Calochortus nuttallii	-	3	-	-	-	-
F	Chaenactis douglasii	3	12	-	-	-	-
F	Comandra pallida	-	-	5	6	.03	.18

T y p e	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
F	<i>Crepis acuminata</i>	-	2	-	-	-	-
F	<i>Draba</i> spp. (a)	-	-	4	-	.01	-
F	<i>Erodium cicutarium</i> (a)	-	-	59	71	1.17	2.45
F	<i>Gilia</i> spp. (a)	-	-	-	2	-	.00
F	<i>Lactuca serriola</i>	-	4	1	-	.00	-
F	<i>Machaeranthera canescens</i>	c33	b8	bc15	a-	.23	-
F	<i>Phlox hoodii</i>	a25	b56	b64	a29	2.58	1.12
F	<i>Phlox longifolia</i>	a-	b18	a-	a3	-	.00
F	<i>Ranunculus testiculatus</i> (a)	-	-	b138	a-	1.04	-
F	<i>Salsola iberica</i> (a)	a-	b58	a-	a-	-	-
F	<i>Sphaeralcea coccinea</i>	14	25	33	28	1.40	1.28
F	<i>Thlaspi alpestre</i>	b11	a-	a-	a-	-	-
Total for Annual Forbs		0	58	505	92	5.53	2.50
Total for Perennial Forbs		103	205	183	78	5.23	2.68
Total for Forbs		103	263	688	170	10.77	5.18

Values with different subscript letters are significantly different at $\alpha = 0.10$

BROWSE TRENDS --

Management unit 21 , Study no: 16

T y p e	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	<i>Artemisia tridentata</i> <i>wyomingensis</i>	23	19	3.15	4.82
B	<i>Chrysothamnus nauseosus</i> <i>hololeucus</i>	1	2	1.00	.71
B	<i>Chrysothamnus viscidiflorus</i> <i>stenophyllus</i>	10	12	.99	1.22
B	<i>Ephedra nevadensis</i>	4	6	1.23	1.91
B	<i>Juniperus osteosperma</i>	2	2	2.90	3.12
Total for Browse		40	41	9.29	11.78

CANOPY COVER, LINE INTERCEPT --

Management unit 21 , Study no: 16

Species	Percent Cover	
	'98	'03
Artemisia tridentata wyomingensis	-	3.20
Chrysothamnus nauseosus hololeucus	-	.85
Chrysothamnus viscidiflorus stenophyllus	-	.46
Ephedra nevadensis	-	.95
Juniperus osteosperma	1.79	6.40

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 21 , Study no: 16

Species	Average leader growth (in)
	'03
Artemisia tridentata wyomingensis	1.3

POINT-QUARTER TREE DATA --

Management unit 21 , Study no: 16

Species	Trees per Acre	
	'98	'03
Juniperus osteosperma	N/A	34

Average diameter (in)	
'98	'03
N/A	2.8

BASIC COVER --

Management unit 21 , Study no: 16

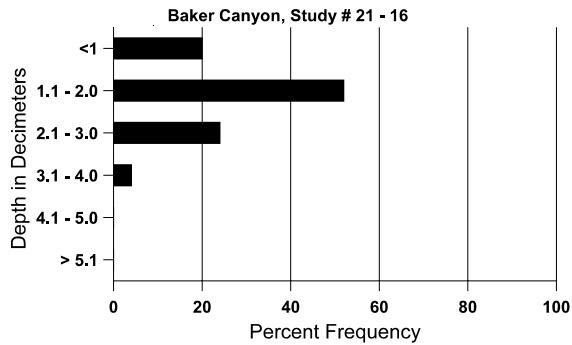
Cover Type	Average Cover %			
	'85	'91	'98	'03
Vegetation	2.50	4.50	33.32	29.96
Rock	2.00	2.75	4.11	2.98
Pavement	26.00	22.75	23.60	34.47
Litter	40.25	42.75	28.61	23.34
Cryptogams	4.50	3.75	1.54	1.45
Bare Ground	24.75	23.50	40.77	19.85

SOIL ANALYSIS DATA --

Management unit 21, Study no: 16, Study Name: Baker Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	% sand	% silt	% clay	% OM	PPM P	PPM K	ds/m
11.1	69.4 (12.0)	7.1	48.0	27.4	24.6	1.0	16.8	140.8	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 21 , Study no: 16

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	7	32	-	-
Deer	13	9	19 (47)	1 (2)
Cattle	4	-	7 (17)	12 (30)

BROWSE CHARACTERISTICS --

Management unit 21 , Study no: 16

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis											
85	3999	600	600	1733	1666	-	65	7	42	13	26/22
91	199	-	133	66	-	-	67	0	0	0	8/8
98	780	-	40	620	120	480	51	3	15	0	21/27
03	560	-	-	400	160	460	7	0	29	21	23/34
Chrysothamnus nauseosus hololeucus											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	20	-	-	20	-	-	0	0	-	0	43/80
03	40	-	40	-	-	-	0	0	-	0	27/44

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Chrysothamnus viscidiflorus stenophyllus											
85	0	-	-	-	-	-	0	0	0	0	-/-
91	66	-	-	66	-	-	100	0	0	0	10/4
98	260	-	-	260	-	20	0	0	0	0	10/13
03	360	-	-	320	40	-	0	0	11	0	11/20
Ephedra nevadensis											
85	66	-	-	66	-	-	100	0	0	0	19/21
91	66	-	-	66	-	-	0	0	0	0	30/43
98	100	-	40	60	-	-	20	20	0	0	26/49
03	320	-	220	80	20	-	6	13	6	6	24/44
Gutierrezia sarothrae											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	14/19
03	0	-	-	-	-	-	0	0	-	0	-/-
Juniperus osteosperma											
85	266	133	266	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	40	-	20	20	-	-	0	0	-	0	-/-
03	40	-	20	20	-	-	0	0	-	0	-/-
Opuntia spp.											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	11/25